(b)

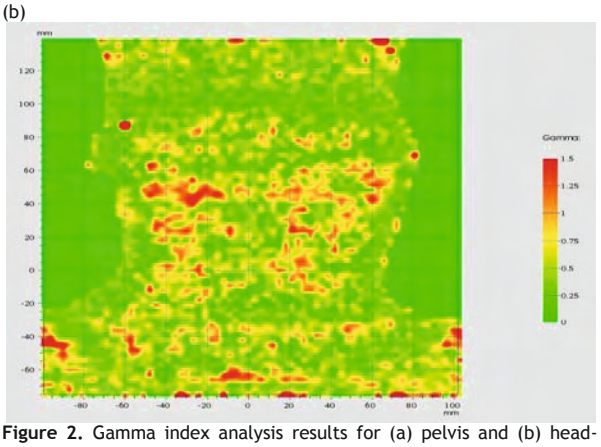
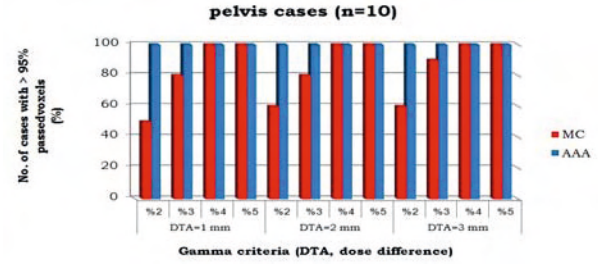
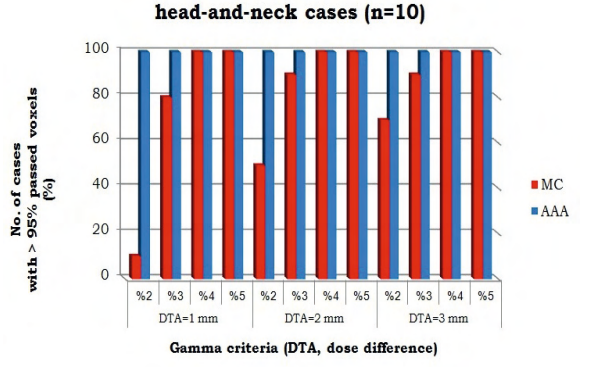


Figure 2. Gamma index analysis results for (a) pelvis and (b) head-and-neck cases

(a)



(b)



Conclusions: The presence of intravenous contrast agent does not significantly affect the dose calculation in CT-based 3D-CRT planning of pelvis and head-and-neck.

EP-1200

Evaluation of inter-operator variability in Tomotherapy planning for head and neck cases

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Purpose/Objective: The dosimetric aspects of radiotherapy treatment plan quality are evaluated with isodoses and dose volume histogram (DVH) values. Usually, the reporting consists in some particular values for target volumes (TV) and organs at risk (OAR). However, due to the complexity of the IMRT dose distributions, given a patient and treatment goals, several operators produce their own optimal plan depending on their experience and their tradeoffs between TV and OAR DVH endpoints. The aim of this study was (1) to evaluate the operator variability in our institution and (2) to improve the relevancy of the DVH endpoints. The study focused on Tomotherapy planning for head and neck cases.
Materials and Methods: Ten patients with bilateral lymphatic node irradiation were selected from our database. Prescribed doses for planning target volumes PTV(tumor) and lymphatic nodes PTV(nodes) were 70Gy and 56Gy in 35 fractions respectively. For each patient, seven physicists of our department produced their own plan based on the same set of contours and the same treatment goals. For plan validation, DVH endpoints were related to the following organs: GTV (D98%), PTV(tumor) (D98%, D2%), PTV(nodes) D(98%), spinal cord (D2%), parotid glands (Dmean, V45Gy, V30Gy), larynx (V50Gy), oral cavity(V50Gy). The inter-operator variability was studied by comparing the DVH values. Three groups of values were evaluated (i) PTVs, (ii) principal OARs for which the respect of endpoints is mandatory and (iii) secondary OARs for which the respect of endpoints improves the patient quality of life.
Results: Physicists had an experience with Tomotherapy planning software ranging from 1 to 5 years. 70 plans were generated and were evaluated by a single physician. For all patients, all plans were clinically acceptable despite some discrepancies. For group (i), the main difference concerned D98% for PTV(tumor) and PTV(nodes) that were lower for two planners. For group (ii), the D2% to the spinal cord never exceeded 38Gy. Large differences were observed but they were considered minor by the physician. For group (iii), experience and tradeoffs of the planners yielded different dosimetric results, especially in the larynx and in the ipsilateral parotid gland. This organ sparing can lead to an slight undercoverage of the PTV(tumor). Whatever the group, differences were particularly observed for the first patients studied, but were reduced during the study.
Conclusions: This work showed inter-operator variability in Tomotherapy planning for head and neck cases. However, all plans were acceptable by the physician. This comparison allowed to better define the priority of the endpoints to evaluate the quality of a plan and to narrow the variability over the study.

EP-1201

A planning comparison study of VMAT and IMRT for prostate cancer.

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Purpose/Objective: Volumetric-modulated arc therapy (VMAT) is a relatively new treatment modality, in which gantry rotation and speed, dose-rate and multileaf collimator (MLC) leaves motion vary simultaneously. The aim of the study was to compare conventional intensity modulated radiation therapy (IMRT) with VMAT plans for prostate cancers.
Materials and Methods: Ten randomly selected patients with prostate cancer were included for the present study. Contours for each pts were drawn using our clinical protocol. For each patient, three plans were generated for treatment modalities using a 80 leaves MLC with the leaves of 10 mm (MLCi2 Elekta Synergy). All IMRT and VMAT plans were calculated for 6MV photons. IMRT plan were generated using Oncentra Master Plan (v 3.3), whereas VMAT plans were performed with Monaco (v 3.2). The dose prescription was 76 Gy in 38 fractions to the target volume with respect the dose volume criteria for the organ at risk (OAR) complied with QUANTEC recommendation. Dose-volume parameters of the plans were evaluated according to Rapport ICRU N° 81.
Results: All techniques: IMRT as well as VMAT result in treatment plans which comply with our current applied clinical protocol. From the DVH data, target coverage achieved similar results for IMRT and VMAT (table1): V95% - 99,3±0,7% and 99,2±0,7% for IMRT and VMAT, respectively. The average dose were 102,5±3,2% for IMRT and 102,4±3,3% for VMAT. For OAR all planning objectives were largely met. VMAT plans were superior for rectum in all dose-volume constraints ($p<0.05$). Similar results were achieved in dose-volume constraints for bladder. VMAT leads to the average reduction of about 6 Gy for the mean dose for rectum and of about 11 Gy for mean dose for bladder comparing to IMRT. There were no statistical differences between IMRT and VMAT in mean and dose-volume parameters for femurs. The average MU were 452±.81,7, and 510.9±.50,6for IMRT and VMAT, respectively.
Conclusions: VMAT achieved similar target coverage to IMRT plans for prostate cancer pts. It provided a better OAR sparing due to reduction of high-dose-receiving area of healthy tissue. Further studies are indicated to evaluated the VMAT impact on quality of life of prostate cancer pts during and after the therapy.

EP-1202

Extended fields irradiation in the upper abdomen with Tomotherapy: planning optimization and dosimetric analysis.

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